ABSTRACT OF THE DISCLOSURE

The present invention relates to DNA molecules of plant origin encoding a modified 5-enol pyruvylshikimate-3-phosphate synthase (EPSPS) enzyme wherein the a first EPSPS coding sequence that normally encodes a threonine residue of a mature EPSPS sequence is modified to encode isoleucine of the mature EPSPS sequence, and a second EPSPS coding sequence that normally encodes a proline residue of a mature EPSPS sequence is modified to encode serine of the mature EPSPS sequence, wherein the first and second residues are respectively located at relatively positions 102 and 106 of a mature EPSPS sequence encoded by said DNA molecule; and the production of a transgenic plant resistant or tolerant to a herbicide of the phosphonomethylglycine family, e.g., glyphosate. The mutated enzyme, which substantially maintains the catalytic activity of the wild-type enzyme, allows for increased tolerance or tolerance of the plant to a herbicide of the phosphonomethylglycine family, and allows for the substantially normal growth or development of the plant, its organs, tissues or cells.